

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-18 (Canceled).

Claim 19 (New): An organic light-emitting diode comprising at least one uncharged transition metal complexes of the formula (I) comprising at least one carbene ligand



wherein the symbols have the following meanings:

$M^1$  is a metal atom selected from the group consisting of Co, Rh, Ir, Nb, Pd, Pt, Fe, Ru, Os, Cr, Mo, W, Mn, Tc, Re, Cu, Ag and Au in any oxidation state possible for the respective metal atom;

carbene is a carbene ligand which may be uncharged or monoanionic and monodentate, bidentate or tridentate, with the carbene ligand also being able to be a biscarbene or triscarbene ligand;

$L$  is a monoanionic or dianionic ligand, which may be monodentate or bidentate;

$K$  is an uncharged monodentate or bidentate ligand selected from the group consisting of phosphines; phosphonates and derivatives thereof, arsenates and derivatives thereof; phosphites; CO; pyridines; nitriles and conjugated dienes which form a  $\pi$  complex with  $M^1$ ;

$n$  is the number of carbene ligands, wherein  $n$  is at least 1 and when  $n > 1$  the carbene ligands in the complex of the formula I can be identical or different;

$m$  is the number of ligands  $L$ , wherein  $m$  can be 0 or  $\geq 1$  and when  $m > 1$  the ligands  $L$  can be identical or different;

o is the number of ligands K, wherein o can be 0 or  $\geq 1$  and when o > 1 the ligands K can be identical or different;

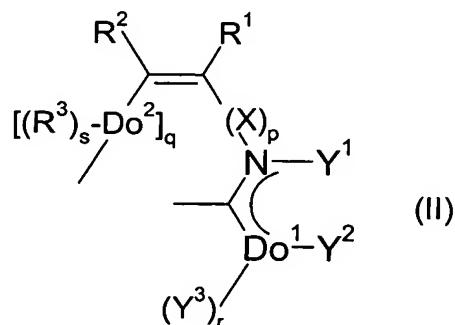
wherein the sum n + m + o is dependent on the oxidation state and coordination number of the metal atom and on the denticity of the ligands carbene, L and K and also on the charge on the ligands carbene and L, with the proviso that n is at least 1.

Claim 20 (New): The organic light-emitting diode as claimed in claim 19, wherein the uncharged transition metal complexes are employed as emitter molecules.

Claim 21 (New): The organic light-emitting diode as claimed in claim 19, wherein the carbene ligand or ligands is/are bidentate.

Claim 22 (New): The organic light-emitting diode as claimed in claim 19, wherein the carbene ligand or ligands is/are monoanionic.

Claim 23 (New): The organic light-emitting diode as claimed in claim 19, wherein the carbene ligand or ligands has/have the formula II



wherein the symbols have the following meanings:

Do<sup>1</sup> is a donor atom selected from the group consisting of C, P, N, O and S  
preferably, P, N, O and S;

Do<sup>2</sup> is a donor atom selected from the group consisting of C, N, P, O and S;

r is 2 when Do<sup>1</sup> is C, is 1 when Do<sup>1</sup> is N or P and is 0 when Do<sup>1</sup> is O or S;

s is 2 when Do<sup>2</sup> is C, is 1 when Do<sup>2</sup> is N or P and is 0 when Do<sup>2</sup> is O or S;

X is a spacer selected from the group consisting of silylene, alkylene, arylene,  
heteroarylene and alkenylene;

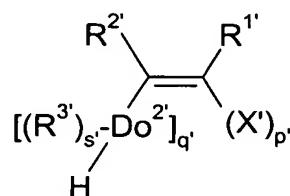
p is 0 or 1;

q is 0 or 1;

Y<sup>1</sup>, Y<sup>2</sup> are each, independently of one another, hydrogen or a carbon-containing group  
selected from the group consisting of alkyl, aryl, heteroaryl and alkenyl groups; or

Y<sup>1</sup> and Y<sup>2</sup> together form a bridge between the donor atom Do<sup>1</sup> and the nitrogen atom  
N which has at least two atoms of which at least one is a carbon atom,

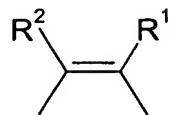
Y<sup>3</sup> is hydrogen or an alkyl, aryl, heteroaryl or alkenyl radical; or



wherein Do<sup>2</sup>', q', s', R<sup>3</sup>', R<sup>1</sup>', R<sup>2</sup>', X' and p' are each, independently of one another, as  
defined for Do<sup>2</sup>, q, s, R<sup>3</sup>, R<sup>1</sup>, R<sup>2</sup>, X and p;

R<sup>1</sup>, R<sup>2</sup> are each, independently of one another, hydrogen or an alkyl, aryl, heteroaryl  
or alkenyl radical, or

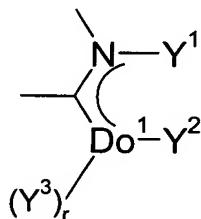
R<sup>1</sup> and R<sup>2</sup> together form a bridge having a total of from three to five atoms of which  
one or two atoms may be heteroatoms and the remaining atoms are carbon atoms, so that the  
group



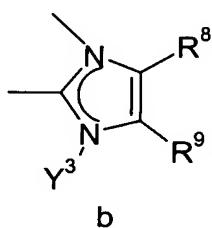
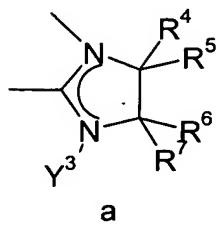
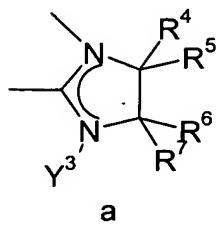
forms a five- to seven-membered, ring which may contain, in addition to the existing double bond, one further double bond or in the case of a six- or seven-membered ring two further double bonds and may be substituted by alkyl or aryl groups and may contain at least one heteroatom; and

$R^3$  is hydrogen or an alkyl, aryl, heteroaryl or alkenyl radical.

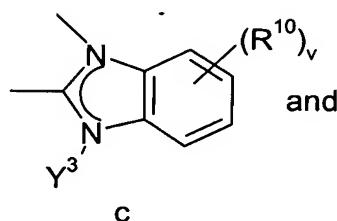
Claim 24 (New): The organic light-emitting diode as claimed in claim 23, wherein the group



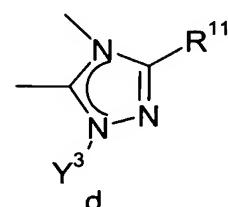
is selected from the group consisting of



b



c



d

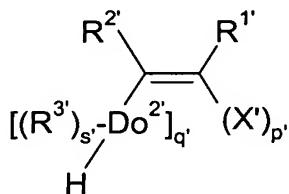
wherein the symbols have the following meanings:

$R^4$ ,  $R^5$ ,  $R^6$ ,  $R^7$ ,  $R^8$ ,  $R^9$  and  $R^{11}$  are each hydrogen, alkyl, aryl, heteroaryl or alkenyl or a substituent which acts as a donor or acceptor;

$R^{10}$  is alkyl, aryl, heteroaryl or alkenyl or 2 radicals  $R^{10}$  together form a fused-on ring, or  $R^{10}$  is a radical which acts as a donor or acceptor;

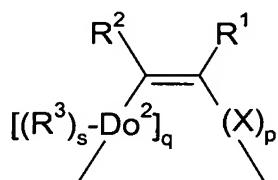
$v$  is from 0 to 4 and when  $v$  is 0 the four carbon atoms of the aryl radical in the formula c which may be substituted by  $R^{10}$  bear hydrogen atoms;

$Y^3$  is a hydrogen atom or an alkyl, aryl, heteroaryl or alkenyl radical; or

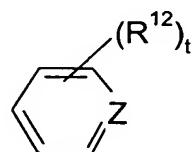


wherein  $Do^2$ ,  $q$ ,  $s$ ,  $R^3$ ,  $R^1$ ,  $R^2$ ,  $X$  and  $p$  are defined, independently of one another, as for  $Do^2$ ,  $q$ ,  $s$ ,  $R^3$ ,  $R^1$ ,  $R^2$ ,  $X$  and  $p$ .

Claim 25 (New): The organic light-emitting diode as claimed in claim 23, wherein the group



denotes the structure



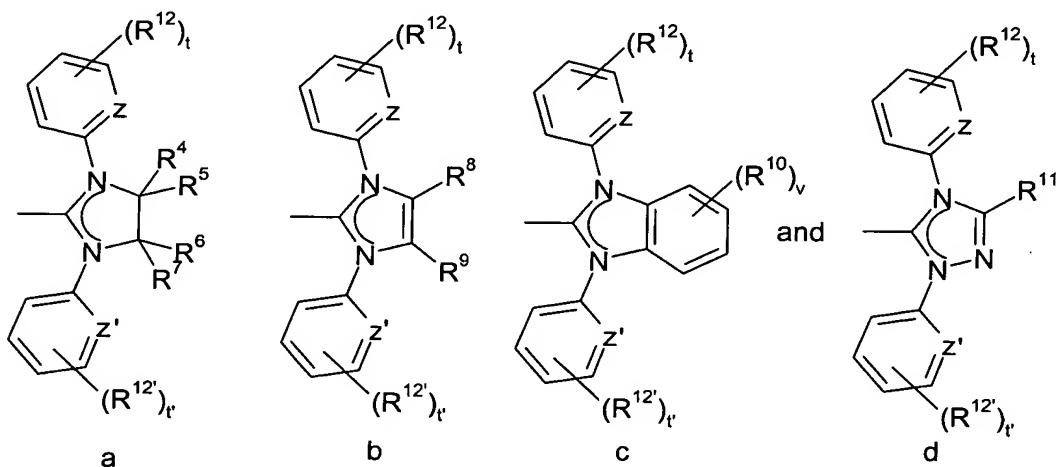
wherein the symbols have the following meanings:

Z is CH or N and can be located in the o, m or p position relative to the point of linkage of the group to the carbene ligand;

R<sup>12</sup> is an alkyl, aryl, heteroaryl or alkenyl radical, or 2 radicals R<sup>12</sup> together form a fused-on ring which may contain one or more heteroatoms, or R<sup>12</sup> is a radical which acts as a donor or acceptor; and

t is 0 to 3 and when t > 1 the radicals R<sup>12</sup> can be identical or different.

Claim 26 (New): The organic light-emitting diode as claimed in claim 23, wherein the carbene ligand or ligands is/are selected from the group consisting of



wherein the symbols have the following meanings:

Z, Z' are identical or different and are each CH or N;

R<sup>12</sup>, R<sup>12'</sup> are identical or different and are each an alkyl, aryl, heteroaryl or alkenyl radical, or 2 radicals R<sup>12</sup> or R<sup>12'</sup> together form a fused-on ring which may contain at least one heteroatom, or R<sup>12</sup> or R<sup>12'</sup> is a radical which acts as a donor or acceptor;

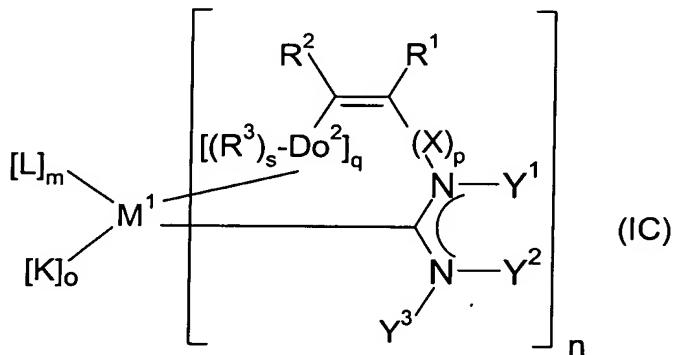
t and t' are identical or different and are each from 0 to 3, and when t or t' > 1 the radicals R<sup>12</sup> or R<sup>12'</sup> can be identical or different;

$R^4, R^5, R^6, R^7, R^8, R^9$  and  $R^{11}$  are each hydrogen, alkyl, aryl, heteroaryl or alkenyl or a radical which acts as a donor or acceptor;

$R^{10}$  is alkyl, aryl, heteroaryl or alkenyl or 2 radicals  $R^{10}$  together form a fused-on ring which may contain at least one heteroatom, or  $R^{10}$  is a radical which acts as a donor or acceptor; and

$v$  is from 0 to 4 and when  $v$  is 0 the four carbon atoms of the aryl radical in the formula  $c$  which may be substituted by  $R^{10}$  bear hydrogen atoms.

Claim 27 (New): An uncharged transition metal complex of the formula IC



wherein the symbols have the following meanings:

$M^1$  is Ru, Rh, Ir, Pt in any oxidation state possible for the respective metal atom;

$L$  is a monoanionic or dianionic ligand, which may be monodentate or bidentate;

$K$  is an uncharged monodentate or bidentate ligand;

$n$  is the number of carbene ligands, wherein  $n$  is at least 2 and the carbene ligands in the transition metal complex can be identical or different;

$m$  is the number of ligands  $L$ , wherein  $m$  can be 0 or  $\geq 1$  and when  $m > 1$  the ligands  $L$  can be identical or different;

o is the number of ligands K, wherein o can be 0 or  $\geq 1$  and in the case of  $o > 1$  the ligands K can be identical or different;

wherein the sum n + m + o is dependent on the oxidation state and coordination number of the metal atom used and the denticity of the ligands and also on the charge on the ligands, with the proviso that n is at least 2;

Do<sup>2</sup> is a donor atom selected from the group consisting of C, N, P, O and S;

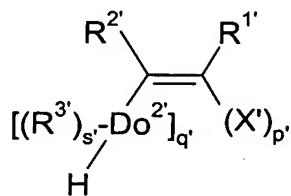
s is 2 when Do<sup>2</sup> is C, is 1 when Do<sup>2</sup> is N or P and is 0 when Do<sup>2</sup> is O or S;

X is a spacer selected from the group consisting of silylene, alkylene, arylene, heteroarylene and alkenylene;

p is 0 or 1;

q is 0 or 1;

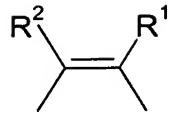
Y<sup>3</sup> is hydrogen or an alkyl, aryl, heteroaryl or alkenyl radical; or



wherein Do<sup>2</sup>, q', s', R<sup>3</sup>', R<sup>1</sup>', R<sup>2</sup>', X' and p' are each, independently of one another, as defined for Do<sup>2</sup>, q, s, R<sup>3</sup>, R<sup>1</sup>, R<sup>2</sup>, X and p;

R<sup>1</sup>, R<sup>2</sup> are each, independently of one another, hydrogen or an alkyl, aryl, heteroaryl or alkenyl radical, or

R<sup>1</sup> and R<sup>2</sup> together form a bridge having a total of from three to five atoms of which one or two atoms may be heteroatoms and the remaining atoms are carbon atoms, so that the group

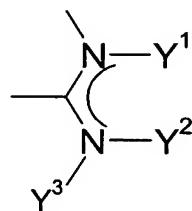


forms a five- to seven-membered ring which may contain, in addition to the existing double bond, one further double bond or in the case of a six- or seven-membered ring two further double bonds and may be substituted by alkyl or aryl groups and may contain heteroatoms, or the ring is fused to further rings which may contain one or more heteroatoms;

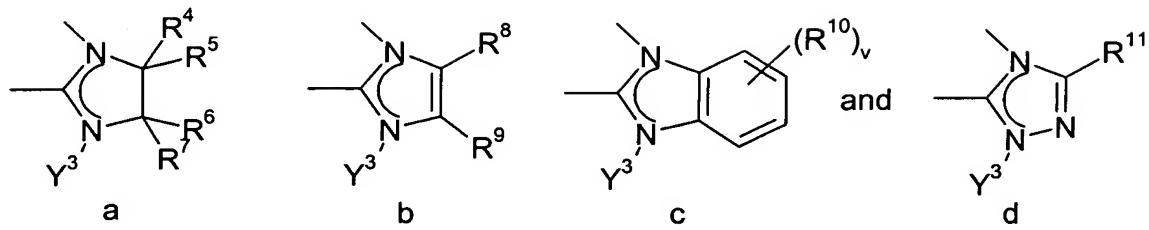
R<sup>3</sup> is hydrogen or an alkyl, aryl, heteroaryl or alkenyl radical; and

Y<sup>1</sup>, Y<sup>2</sup> together form a bridge between the nitrogen atoms N which has at least two atoms of which at least one is a carbon atom, wherein the bridge can be saturated or unsaturated and the two or more atoms of the bridge may be substituted or unsubstituted and when the bridge has two carbon atoms and is saturated at least one of the two carbon atoms is substituted.

Claim 28 (New): The uncharged transition metal complex as claimed in claim 27, wherein the group



is selected from the group consisting of



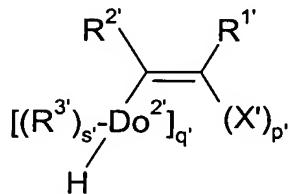
wherein the symbols have the following meanings:

$R^4, R^5, R^6, R^7, R^8, R^9$  and  $R^{11}$  are each, independently of one another, hydrogen, alkyl, aryl, heteroaryl or alkenyl, wherein at least one of the radicals  $R^4, R^5, R^6$  and  $R^7$  in the formula a is not hydrogen, or a radical which acts as a donor or acceptor;

$R^{10}$  is alkyl, aryl, heteroaryl or alkenyl or 2 radicals  $R^{10}$  together form a fused-on ring which may contain one or more heteroatoms, or  $R^{10}$  is a radical which acts as a donor or acceptor;

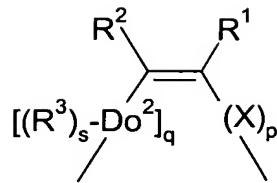
$v$  is from 0 to 4 and when  $v$  is 0 the four carbon atoms of the aryl radical in the formula c which may be substituted by  $R^{10}$  bear hydrogen atoms;

$Y^3$  is a hydrogen atom or an alkyl, aryl, heteroaryl or alkenyl radical; or

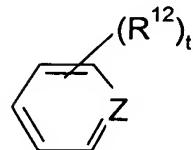


wherein  $Do^{2'}$ ,  $q'$ ,  $s'$ ,  $R^{3'}$ ,  $R^{1'}$ ,  $R^{2'}$ ,  $X'$  and  $p'$  are each, independently of one another, defined as for  $Do^2$ ,  $q$ ,  $s$ ,  $R^3$ ,  $R^1$ ,  $R^2$ ,  $X$  and  $p$ .

Claim 29 (New): The uncharged transition metal complex as claimed in claim 27, wherein the group



denotes the structure



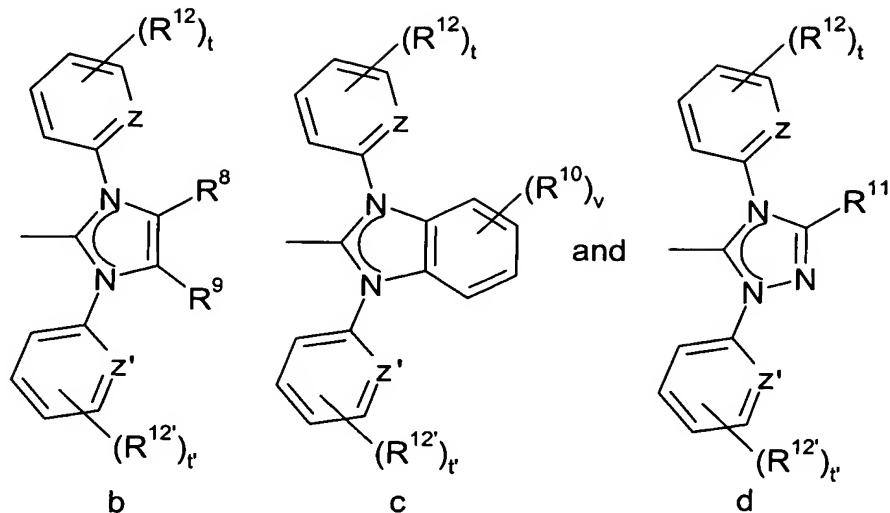
wherein the symbols have the following meanings:

Z is CH or N and can be located in the o, m or p position relative to the point of linkage of the group to the carbene ligand;

$R^{12}$  is an alkyl, aryl, heteroaryl or alkenyl radical, or 2 radicals  $R^{12}$  together form a fused-on ring which may contain one or more heteroatoms, or  $R^{12}$  is a radical which acts as a donor or acceptor; and

t is 0 to 3 and when  $t > 1$  the radicals  $R^{12}$  can be identical or different.

Claim 30 (New): The uncharged transition metal complex as claimed in claim 27, wherein the two or more carbene ligands are selected independently from the group consisting of:



wherein the symbols have the following meanings:

Z, Z' are identical or different and are each CH or N;

R<sup>12</sup>, R<sup>12'</sup> are identical or different and are each an alkyl, aryl, heteroaryl or alkenyl radical, or 2 radicals R<sup>12</sup> or R<sup>12'</sup> together form a fused-on ring which may contain at least one heteroatom, or R<sup>12</sup> or R<sup>12'</sup> is a radical which acts as a donor or acceptor;

t and t' are identical or different and are each from 0 to 3, and when t or t' > 1 the radicals R<sup>12</sup> or R<sup>12'</sup> can be identical or different;

R<sup>8</sup>, R<sup>9</sup> and R<sup>11</sup> are each hydrogen, alkyl, aryl, heteroaryl or alkenyl or a radical which acts as a donor or acceptor;

R<sup>10</sup> is alkyl, aryl, heteroaryl or alkenyl or 2 radicals R<sup>10</sup> together form a fused-on ring which may contain at least one heteroatom, or R<sup>10</sup> is a radical which acts as a donor or acceptor; and

v is from 0 to 4 and when v is 0 the four carbon atoms of the aryl radical in the formula c which may be substituted by R<sup>10</sup> bear hydrogen atoms.

Claim 31 (New): The uncharged transition metal complex as claimed in claim 27, wherein M<sup>1</sup> is Ir(III), n is 3 and m and o are each 0, with the three carbene ligands preferably being identical.

Claim 32 (New): A process for preparing transition metal complexes as claimed in claim 27 by the deprotonation of the ligand precursors corresponding to the appropriate carbene ligands and subsequent reaction with suitable metal complexes in which the desired metal is present.

Claim 33 (New): An OLED comprising at least one transition metal complex as claimed in claim 27.

Claim 34 (New): A light-emitting layer comprising at least one transition metal complex as claimed in claim 19.

Claim 35 (New): An OLED comprising a light-emitting layer as claimed in claim 34.

Claim 36 (New): A device selected from the group consisting of stationary VDUs such as VDUs of computers, televisions, VDUs in printers, kitchen appliances and advertising signs, lighting units, information signs, and mobile VDUs such as VDUs in mobile telephones, laptops, vehicles and destination displays on buses and trains comprising an OLED as claimed in claim 19.

Claim 37 (New): A light-emitting layer comprising at least one transition metal complex as claimed in claim 27.

Claim 38 (New): An OLED comprising a light-emitting layer as claimed in claim 37.

Claim 39 (New): A device selected from the group consisting of stationary VDUs such as VDUs of computers, televisions, VDUs in printers, kitchen appliances and advertising signs, lighting units, information signs, and mobile VDUs such as VDUs in mobile telephones, laptops, vehicles and destination displays on buses and trains comprising an OLED as claimed in claim 33.

Claim 40 (New): A device selected from the group consisting of stationary VDUs such as VDUs of computers, televisions, VDUs in printers, kitchen appliances and advertising signs, lighting units, information signs, and mobile VDUs such as VDUs in mobile telephones, laptops, vehicles and destination displays on buses and trains comprising an OLED as claimed in claim 35.

Claim 41 (New): A device selected from the group consisting of stationary VDUs such as VDUs of computers, televisions, VDUs in printers, kitchen appliances and advertising signs, lighting units, information signs, and mobile VDUs such as VDUs in mobile telephones, laptops, vehicles and destination displays on buses and trains comprising an OLED as claimed in claim 38.